

# Audit

# Report



## OFFICE OF THE INSPECTOR GENERAL

### MANPOWER, PERSONNEL, AND TRAINING REQUIREMENTS FOR ARMY TACTICAL COMMAND AND CONTROL SYSTEM

Report No. 93-171

September 20, 1993

20000418 050

DTIC QUALITY INSPECTED 3 Department of Defense

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ABJ00-07-1772

## **Acronyms**

AFATDS	Advanced Field Artillery Tactical Data System
ASA(MRA)	Assistant Secretary of the Army (Manpower and Reserve Affairs)
ATCCS	Army Tactical Command and Control System
CSSCS	Combat Service Support Control System
DCS PER	Deputy Chief of Staff for Personnel
DUSD-A	Deputy Under Secretary of Defense for Acquisition
FAADC <sup>2</sup> I	Forward Area Air Defense Command, Control and Intelligence System
HSI	Human Systems Integration
MANPRINT	Manpower and Personnel Integration
MCS	Maneuver Control System
NET	New Equipment Training
SMMP	System MANPRINT Management Plan
TRADOC	Training and Doctrine Command



INSPECTOR GENERAL  
DEPARTMENT OF DEFENSE  
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ARLINGTON, VIRGINIA 22202

September 20, 1993

MEMORANDUM FOR INSPECTOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Audit Report on Manpower, Personnel, and Training Requirements for Army Tactical Command and Control System (Report No. 93-171)

We are providing this final report for your information and use. The report addresses the Army's process for evaluating the impact of Army Tactical Command and Control System operating and training concepts on available manpower, personnel, and training resources. Comments on the draft were not received by the report date.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, we request that the Secretary of the Army, Assistant Secretary of the Army (Manpower and Reserve Affairs), and Army Acquisition Executive provide comments on the finding and recommendations by November 22, 1993. The directive also requires that your comments indicate concurrence or nonconcurrence with the finding and each recommendation addressed to you. If you concur, describe the corrective actions taken or planned, the completion dates for actions already taken, and the estimated dates for completion or planned actions. If you nonconcur, state your specific reasons for each nonconcurrence. If appropriate, you may propose alternative methods to carry out the desired improvements.

Recommendations are subject to resolution in accordance with DoD Directive 7650.3 if you nonconcur or fail to comment. We also ask that your comments indicate concurrence or nonconcurrence with the internal controls weakness highlighted in Part I.

We appreciate the courtesies extended to the staff. If you have questions on this audit, please contact Mr. James L. Koloshey, Program Director, at (703) 614-6225 (DSN 224-6225) or Mr. Charles E. Sanders III, Project Manager, at (703) 614-6219 (DSN 224-6219). The planned distribution of this report is listed in Appendix E.

Robert J. Lieberman  
Assistant Inspector General  
for Auditing

## **Office of the Inspector General, DoD**

Report No. 93-171  
(Project No. 2AG-0023)

September 20, 1993

### **AUDIT REPORT ON MANPOWER, PERSONNEL, AND TRAINING REQUIREMENTS FOR ARMY TACTICAL COMMAND AND CONTROL SYSTEM**

#### **EXECUTIVE SUMMARY**

**Introduction.** DoD policy requires that the impact of new weapon systems on available manpower, personnel, and training resources be addressed throughout the acquisition process. Critical human factors that have a significant impact on readiness, life-cycle costs, schedule, or performance should be addressed at each milestone decision. Specifically, resources in support of new systems should be committed and programmed by Milestone II and Milestone III decisions, respectively.

**Objectives.** The overall objective was to determine whether the Army's internal controls and procedures are adequate to ensure that manpower, personnel, and training requirements are planned effectively for operation of new weapon systems. We also determined whether resources were committed or programmed for new personnel and training requirements. To accomplish the audit objectives, we focused on four of the five major component systems of the Army Tactical Command and Control System (ATCCS).

**Audit Results.** The Program Executive Officer for Command and Control Systems has not determined the impact of ATCCS manpower, personnel, and training requirements on available resources. Consequently, the Army may field mission-essential command and control systems without enough properly trained personnel for sustained operations in wartime.

**Internal Controls.** Internal controls were not effective to ensure that Army human systems integration was properly executed for all Army acquisition programs. Part I discusses these internal control weaknesses.

**Potential Benefits of Audit.** The audit did not disclose monetary benefits. However, implementation of report recommendations should improve the acquisition process. The potential benefits are summarized in Appendix C.

**Summary of Recommendations.** We recommended that the Army Acquisition Executive direct the Program Executive Officer for Command and Control Systems to revise ATCCS System Manpower and Personnel Integration Management Plans to ensure that manpower, personnel, and training requirements are properly evaluated as a condition of Milestone III approval. Also, we recommended that the Secretary of the Army designate the Assistant Secretary of the Army (Manpower and Reserve Affairs) as the proponent for Human Systems Integration. In addition, we recommended that the Assistant Secretary of the Army (Manpower and Reserve Affairs) take a more active role in review and oversight of Human Systems Integration.

**Management Comments.** The Army did not respond to the draft report. The Secretary of the Army, Assistant Secretary of the Army (Manpower and Reserve Affairs), and the Army Acquisition Executive are requested to provide comments on the final report by November 22, 1993.

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The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD, prepared this report. Copies of the report can be obtained from the Secondary Reports Distribution Unit, Audit Planning and Technical Support Directorate, (703) 614-6303 (DSN 224-6303).

## **Part I - Introduction**

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## **Background**

**Army Tactical Command and Control Systems (ATCCS).** ATCCS is a mobile network of data processing systems that will collect, process, transmit, and display technical, staff, and command information within and among each battlefield functional area. ATCCS will consist of five Component Systems, each operating within a specific battlefield functional area. The Component Systems are the Forward Area Air Defense Command, Control and Intelligence System (FAADC<sup>2</sup>I) for air defense, Maneuver Control System (MCS) for maneuver, Advanced Field Artillery Tactical Data System (AFATDS) for fire support, Combat Service Support Control System (CSSCS) for combat service support, and the All Source Analysis System for intelligence and electronic warfare.

The Army planned to procure about 17,100 nondevelopmental items, ruggedized computers, peripheral equipment (such as printers, modems, and display panels), and commercial software for common support of the FAADC<sup>2</sup>I, MCS, AFATDS, and CSSCS. Of the 17,100 computers, 14,200 will not replace existing equipment. Computer software will be developed and procured for system-specific applications, maintenance fault-isolation, initial training (MCS and CSSCS), and sustainment training. The Program Executive Officer for Command and Control Systems, Ft. Monmouth, New Jersey, is responsible for ATCCS. Program/Project Managers were designated for each Component System to develop the system's application software. Appendix A contains further information on audited ATCCS Component Systems. Appendix B contains photos of common hardware for ATCCS.

**Operating Concept.** While on alert status, Component Systems will require two military personnel for 24-hour operations, in two 12-hour shifts with one person per shift. A backup operator will also be required for each command post in case a primary operator is not available for duty.

**Training Concept.** Three types of training will be provided unit-level operators and maintainers of ATCCS Systems: New Equipment Training (NET), Institutional Training, and Unit-Level Training.

**New Equipment Training.** When Component Systems are fielded, a mobile team of instructors, called a NET Team, will provide initial training to intended operators and maintainers. The NET Team will teach courses in operations, unit-level maintenance, and doctrine and tactics applicable to system hardware and software.

**Institutional Training.** Initial entry training on operation and maintenance of AFATDS and FAADC<sup>2</sup>I will be provided by a U.S. Army Training and Doctrine Command (TRADOC) Service school. Institutional training will be limited for MCS and CSSCS since specific occupational specialties have not been designated for these Systems. Senior-level personnel will be trained to be unit-level master trainers for MCS.

**Unit-Level Training.** Unit Commanders will determine the frequency and amount of sustainment training for assigned operators of ATCCS Component Systems. For CSSCS and MCS, commanders will select system operators and provide initial and sustainment training. ATCCS operators will use computer-embedded software primarily for training in conjunction with operating manuals and training materials provided by NET Teams. In addition, unit commanders will provide time and resources to support all unit-level training.

## Objectives

The overall objective was to determine whether the Army's internal controls and procedures are adequate to ensure that manpower, personnel, and training requirements are planned effectively for operation of new weapon systems. We also determined whether resources were committed or programmed for new personnel and training requirements for new systems. To accomplish the audit objectives, we reviewed ATCCS Component Systems.

## Scope

This economy and efficiency audit was conducted from July 1992 through March 1993. The audit was performed in accordance with the auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD, and included necessary tests of internal controls. We reviewed program documentation dated from September 1986 through March 1993 for four of five ATCCS Component Systems (MCS, AFATDS, FAADC<sup>2</sup>I, and CSSCS) to determine whether the impact of these Systems' operating and training concepts on available resources (personnel and funds) was adequately evaluated and whether sufficient resources have been committed or programmed for these systems. Also, we obtained assessments from personnel assigned to selected combat units and reviewed lessons learned reports for Tactical Fire Direction System, Lightweight Tactical Fire Direction System, Battery Control System, Single Channel Ground and Airborne Radio System, and Mobile Subscriber System to determine the adequacy of training provided operators and maintainers of tactical and communications systems that will be replaced by or interface with ATCCS. In addition, we reviewed the implementation, review, and oversight of the Army's Human Systems Integration (HSI) program (Manpower and Personnel Integration

## **Introduction**

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[MANPRINT]) for Component Systems audited. Our review was limited to the Active Duty Army only. We did not address personnel skills and aptitudes, initial training, and tests and evaluations for AFATDS. Organizations visited or contacted during the audit are listed in Appendix D.

## **Internal Controls**

We reviewed internal controls applicable to acquisition of new Army weapon systems. In assessing internal controls, we evaluated implementation and oversight of MANPRINT for the ATCCS Component Systems reviewed. Our review disclosed that proper MANPRINT had not been implemented to ensure that pertinent manpower, personnel, and training issues related to acquisition of ATCCS were addressed and resolved. The ATCCS MANPRINT programs did not provide for timely status of manpower, personnel, and training issues and resourcing of systems' support requirements. Also, adequate review and oversight was not performed to ensure that MANPRINT was properly executed for all Army acquisition programs. The recommendations in this report, if implemented, will assist in correcting these weaknesses. No quantifiable monetary savings will be realized from implementing the recommendations. Copies of the final report will be provided to the senior officials responsible for internal controls within Office of the Secretary of Defense and the Army.

## **Prior Audits and Other Reviews**

IG, DoD, Audit Report No. 91-063, "Use of the Baseline Concept in Managing Major Weapon System Acquisitions," March 18, 1991, disclosed that initial training was not accomplished by planned initial operating capability dates because training was under-emphasized in the acquisition process. The report recommended that new DoD guidance include requirements for program managers to establish milestones for initial training in the quarterly Defense Acquisition Executive Summary for major weapon systems in the production phase of acquisition. Management generally concurred with the report and initiated corrective actions.

IG, DoD, Audit Report No. 93-087, "Review of the All Source Analysis System as a Part of the Audit of the Effectiveness of the Defense Acquisition Board Review Process--FY 1993," April 20, 1993, disclosed that appropriate Defense Acquisition Board reviews and testing and evaluations of the System Program were not held or planned. Our review also disclosed deficiencies for planning of test and evaluations for the other ATCCS Component Systems. The report recommended that a Defense Acquisition Board Milestone II review of the All Source Analysis System Program be conducted and that remaining FY 1993 Program funding be withheld until an acquisition decision memorandum is issued following the Milestone review. Management partially concurred with the finding and recommendations.

## **Introduction**

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Limited operational tests of MCS were reported by the General Accounting Office in General Accounting Office/National Security and International Affairs Division-92-151, "Battlefield Automation - Planned Production Decision for Army Control System Is Premature," August 1992. The report recommended that testing of MCS be improved. Management nonconcurred.

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## **Part II - Finding and Recommendations**

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## **Manpower, Personnel, and Training Requirements**

The Program Executive Officer for Command and Control Systems has not planned or conducted adequate analyses to determine the impact of ATCCS manpower, personnel, and training requirements on available resources. Furthermore, tests and evaluations did not completely address pertinent manpower, personnel, and training issues. We attributed these deficiencies to failure by the Army to adequately implement Human Systems Integration and to provide adequate program oversight. Consequently, the Army risks fielding mission-essential command and control systems without enough properly trained personnel for sustainment of system operations in wartime.

### **Background**

**DoD Policy.** DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991, requires that Human Systems Integration (HSI) (referred to as MANPRINT by the Army) be executed for each planned system acquisition. HSI objectives should be established at Milestone I and subsequently refined and updated at successive milestone decision points. HSI should address critical human factors that have a significant impact on system performance, maintainability, readiness, and training requirements. HSI should focus on personnel constraints and equipment deficiencies with existing systems and the impact of new system's support requirements on available personnel resources. HSI should also provide for analyses, tests, and evaluations to determine supportability of new systems with available personnel resources before production and deployment. Test and evaluation requirements should include performance of critical operating tasks by typical users in Test and Evaluation Master Plans. Adequate numbers of personnel to support an acquisition program should be programmed or committed to be programmed by Milestone II. Personnel resources should be programmed by Milestone III.

**Army Policy.** Army Regulation 70-1, "Army Acquisition Policy," March 31, 1993, implements DoD Instruction 5000.2 and prescribes that Program Executive Officers and Program/Project Managers are responsible for determining and resourcing manpower, personnel, and training requirements for new weapon systems. Army Regulation 602-2, "Manpower and Personnel Integration (MANPRINT) in the Materiel Acquisition Process," April 18, 1990, implements the DoD requirement for HSI. The Program Executive Officers and Program/Project Managers are responsible for execution of MANPRINT program requirements and the Army Training and Doctrine Command (TRADOC) supports Program Executive Officers and Program/Project

Managers by preparing the System MANPRINT Management Plan (SMMP). The SMMP is a planning and management guide and an audit trail that identifies tasks, analyses, trade-offs, and decisions that must be made to address manpower, personnel, and training issues.

## **Impact of ATCCS on Available Resources**

The ATCCS Operational and Organizational Plan states that replacement of existing systems with ATCCS will require no additional manpower positions. The ATCCS System Training Plan states that unit level training could be accomplished by combat units. Furthermore, the Training Plan implies that existing personnel skills and aptitudes are adequate to enable personnel to be trained on operation and maintenance of ATCCS. We concluded, however, that adequate analyses were not conducted to determine the impact of ATCCS operating and training concepts on manpower requirements, personnel skills and aptitudes, and training support.

**Manpower Requirements.** Unconstrained analyses were neither planned nor performed to determine manpower requirements to support ATCCS. About 17,100 computers and peripheral equipment will be procured for the systems reviewed. This purchase will result in a net increase of 14,200 computers. In addition, formal analyses were not made to determine how requirements would be supported with available manpower positions and whether additional manpower authorizations for support of ATCCS were needed. Specifically, peacetime and wartime workload for personnel tasks associated with support of ATCCS component systems and other military duties in terms of frequency and time to accomplish was not determined. Manning requirements for workload and command posts in wartime were not quantified. Also, trade-off analyses for support of ATCCS Component Systems and existing systems and processes to be replaced were not made. In effect, manpower requirements were based on the Army Force Structure. The practice of basing manpower requirements on the Army Force Structure was confirmed in 1992 by a General Officer Steering Committee that criticized the Army's process for determining manpower requirements.

**FAADC<sup>2I</sup>.** Our review of initial manpower requirements and Modified Tables of Organization and Equipment disclosed that two instead of three operators were being considered for command post operations of systems to be employed at Battery Level. Thus, backup operators were not being considered in requirements determinations. We concluded that the Army could have a shortage of 208 (28 percent) of the 743 System operators needed by the end of FY 1998 based on positions programmed and systems scheduled to be fielded as of December 1992.

**AFATDS.** Army manpower authorizations were not adequate to provide for sustained combat operations of systems to be replaced by AFATDS. Three personnel were required for continuous system operations in combat,

## **Manpower, Personnel, and Training Requirements**

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two primary operators (one per 12-hour shift) and one backup operator. A 1990 contractor study disclosed that the Army Force Structure provided two operators for most of the AFATDS to be procured. Two primary operators will not be enough to operate AFATDS and perform non-AFATDS tasks. In addition, the constraint for the existing systems was not identified in the Mission Needs Statement for AFATDS at Milestone II as required by DoD policy.

**CSSCS.** Manpower requirements for support of the System have not yet been determined. The Army planned to procure one system per applicable unit in corps through brigade-level organizations. Results of the Early User Test and Evaluation conducted in September and October 1992 revealed that some division and brigade-level units may require one to three additional systems during peak workload periods. Additionally, the number of personnel needed to operate each system during a 12-hour period was not determined. The Project Manager envisioned the number of operators per system in a combat environment to be three to five for a 12-hour period. To resolve these issues, TRADOC initiated a study in January 1992 to determine the impact of CSSCS operating and training requirements on available manpower, personnel, and training resources. The study was scheduled to be completed in March 1994. This analysis should have been completed by the Milestone II decision of December 1990.

**Personnel Skills and Aptitudes.** Our review disclosed that personnel skills and aptitudes were not properly considered in developing training programs and related materials. Analyses have not been made to determine minimal skills and aptitudes of military personnel, the target audience to operate MCS and CSSCS, and were incomplete for FAADC<sup>2I</sup>. Thus, operating manuals, embedded system software, and other training materials were not tailored to the target audiences. Two examples follow.

**MCS.** The minimum reading grade level for the MCS target audience is eighth grade. Our tests showed that 90 percent of technical manuals were written above the ninth grade level. Fifty percent were written at the twelfth grade level and above, at least four grade levels higher than the minimum reading grade level for the target audience. Also, Personnel Command records show that 44 percent of the target audience were in mental categories IIIB and IV, according to Armed Forces Qualification Test scores. These personnel are considered to be marginally trainable and require more training in greater length and frequency than personnel in mental categories I to IIIA.

**FAADC<sup>2I</sup>.** Armed Forces Qualification Test scores were not properly considered in developing programs for institutional and sustainment training of the target audience for FAADC<sup>2I</sup>. Army Personnel Command records show that 53 percent of the military personnel in the target audience (Military Occupational Specialty 16J) were mental categories IIIB and IV. These personnel were not considered in determining length of institutional training and content of both institutional and software training.

## Manpower, Personnel, and Training Requirements

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**Training Support.** The ability of operational units to provide initial training to operators of MCS and CSSCS and sustainment training for all systems reviewed was not assessed. TRADOC was reviewing the impact of CSSCS training requirements in the previously discussed CSSCS study. Also, sufficient numbers of personnel for FAADC<sup>2</sup>I and AFATDS NET Teams have not been committed to be programmed.

**Initial Training.** The following issues have not been addressed in analyses to determine the feasibility of relying on operating units to provide initial training for MCS and CSSCS.

- o Can personnel, with no prior knowledge of systems, learn systems' operations with computer-embedded training software?
- o Will additional training materials or experienced unit personnel be required to assist in training new operators?
- o How long will it take for persons, with no prior knowledge of systems, to learn systems' operations?
- o How will units incorporate requirements for initial operator training into their training cycle?
- o Since military personnel, who will receive MCS master operator training, will not be awarded an additional skill identifier, how will the Army properly utilize such personnel?

**Sustainment Training.** Issues not addressed include:

- o How often will ATCCS operators need sustainment training to be combat ready?
- o Can peacetime operations and field exercises provide ATCCS operators with needed individual training for sustainment of their skills?

**Resources for NET Teams.** Contractor support for the FAADC<sup>2</sup>I NET Team has not been adequately funded and military manpower for AFATDS NET Teams has not been adequately programmed. Although funds have been programmed to support FAADC<sup>2</sup>I training in FY 1993 and FY 1994, no funds were programmed for FY 1995 through FY 1998. Manpower authorizations have not been programmed for 31 of the 50 military personnel required for AFATDS NET Teams. From FY 1996 through FY 2002, 95 personnel will be required for AFATDS NET Teams. The NET Teams will consist of 50 military personnel and 45 contractor personnel. Deputy Chief of Staff for Operations, the decision authority, has directed that the AFATDS Project Manager will compete with the rest of the Army in obtaining manpower authorizations for the 31 personnel. This problem was known and not reported to Army Systems Acquisition Review Council (the Council) at the Milestone II Decision in 1989. According to DoD policy, programming of resources is a major decision criteria at Milestones II and III.

## **Manpower, Personnel, and Training Requirements**

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### **Test and Evaluation**

Test and Evaluation Master Plans and tests performed for FAADC<sup>2</sup>I, MCS, and CSSCS did not adequately address manpower, personnel, and training issues and did not simulate actual battlefield conditions. Also, the plans did not provide for analysis to determine whether target audiences can effectively use embedded training software and user manuals to learn operation of these Systems.

**FAADC<sup>2</sup>I.** Two major tests and evaluations have been accomplished. The first test was conducted in November and December 1991 to determine whether typical military personnel trained by the contractor could perform key tasks with the FAADC<sup>2</sup>I software. Also, a combined Force Development Test and Evaluation and Limited User Test was conducted in January and February 1993 to demonstrate system hardware and software developed for the light division and included assessments of the manpower, personnel, and training concepts.

In our opinion, the tests were not effective. The first test was not conducted under extreme environmental conditions as specified in the Requirements Operational Capability document. Neither test demonstrated whether military personnel with low Armed Forces Qualification Test scores would be able to operate FAADC<sup>2</sup>I according to system standards. Also, the second test did not demonstrate the adequacy of the planned training because test personnel had prior experience with FAADC<sup>2</sup>I.

**MCS and CSSCS.** As discussed above, minimal reading grade levels and Armed Forces Qualification Test scores of the target audiences for MCS and CSSCS have not been defined. Also, no demonstrations were made to determine that personnel unfamiliar with MCS and CSSCS can learn systems' operations with no prior knowledge. Further, no plans have been made as to how personnel with minimal reading skills and categorized as marginally trainable would be selected to participate in the operator tests and evaluations.

### **Human Systems Integration**

**SMMP.** For the four systems reviewed, SMMPs were not initiated at Concept Studies Approval (Milestone 0) and updated by each milestone decision as required by DoD and Army policy. For FAADC<sup>2</sup>I, the initial SMMP was approved after the Milestone II Decision. For AFATDS and CSSCS, initial SMMPS were approved by Milestone II. For MCS, a SMMP was prepared but never approved. A SMMP should identify what and when analyses are to be conducted. The lack of comprehensive and timely SMMPs was a major cause of deficiencies discussed above.

**FAADC<sup>2</sup>I.** The initial SMMP was not approved until January 27, 1993, more than 6 years after the Milestone II decision in July 1986. The SMMP adequately identified MANPRINT objectives and manpower, personnel,

## Manpower, Personnel, and Training Requirements

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and training issues and provided that most assessments will be accomplished by workload analyses and Initial Operating Tests and Evaluations; however, dates for accomplishing assessments were not established.

**AFATDS.** The U.S. Army Soldier Support Center (the Center), National Capitol Regional Office (currently a Personnel Command activity), concluded that the SMMP did not outline a viable MANPRINT program and did not address known constraints with existing systems and manual processes to be replaced by AFATDS. Although listing manpower goals to be achieved, the SMMP did not outline the steps to achieve these goals and identify all issues associated with obtaining these goals. For example, the problem with obtaining manpower authorizations for manning of NET Teams was omitted. Also, supportability of AFATDS could not be determined because manpower, personnel, and training data were not developed and documented at the Milestone II decision. Therefore, the Center concluded that Milestone II decision for the AFATDS program should be delayed until manpower, personnel, and training requirements are determined and can be resourced.

**CSSCS.** The SMMP did not provide for analysis to determine the impact of operating and training concepts. Consequently, such a study was not initiated until January 1992, almost 2 years after the Milestone II Decision.

**Review and Oversight.** MANPRINT programs for the ATCCS Component Systems were not afforded the review and oversight required by Army Regulation 602.2. Review and oversight were lacking by the Program Executive Officer for Command and Control Systems, the Deputy Chief of Staff for Personnel (DCSPER), and the Assistant Secretary of the Army (Manpower and Reserve Affairs) (ASA[MRA]).

**Program Executive Officer.** The Program Executive Officer, in charters to Program/Project Managers, did not make them accountable for integrating MANPRINT into acquisition programs. Discussions with cognizant personnel from the offices of the Program Executive Officer and Program/Project Managers indicated that support of MANPRINT was given low priority in the acquisition process.

**DCSPER.** MANPRINT programs for AFATDS and CSSCS were reviewed before Milestone II Decisions; however, DCSPER's reviews were incomplete and the Council was not advised of the adequacy of MANPRINT SMMPs. For example, in memoranda to the Council on AFATDS, DCSPER inaccurately portrayed manpower, personnel, and training issues as areas of concern that should be addressed before Milestone III. The U.S. Army Soldier Support Center concluded from its review of the SMMP that manpower, personnel, and training issues were critical to the Milestone II decision and should be resolved before the Milestone II decision as previously discussed.

**ASA(MRA).** Emphasis on MANPRINT could be improved by requiring ASA(MRA) to be the proponent because ASA(MRA) is the proponent for the Manpower Estimate Report which also addresses manpower, personnel, and training issues on major system acquisitions. In addition, ASA(MRA) is a voting member of the Council while DCSPER, the proponent for MANPRINT,

## **Manpower, Personnel, and Training Requirements**

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is not. Thus, ASA(MRA) would have the authority to implement DCSPER recommendations regarding MANPRINT issues and represent both MANPRINT programs and Manpower Estimate Reports with the Council.

**Army Resources for MANPRINT Programs.** Lack of emphasis for MANPRINT was attributed by representatives of the Program Executive Officer, Program/Project Managers, TRADOC, and DCSPER to a shortage of personnel resources. When the requirements for MANPRINT were established, personnel were not dedicated to the programs. Instead, support of MANPRINT was assigned to personnel as an additional duty. In DCSPER, two persons were assigned for review and oversight of MANPRINT, an insufficient number to monitor all Army acquisition programs and conduct MANPRINT evaluations on major system acquisitions.

## **Conclusions**

ATCCS Component Systems will likely not have enough properly trained personnel to sustain operations in a wartime environment unless HSI factors are adequately assessed and resourced. Some personnel may not be capable of using computer software for initial and sustainment training because software was not being designed to satisfy user needs. In addition, unit commanders may have to decrease support of other mission-essential systems so that ATCCS training requirements can be accomplished. We found HSI deficiencies on existing systems that will be replaced by ATCCS deployed in Europe and Operation Desert Storm.

**Europe.** Our discussion with cognizant personnel in all echelons of command in the 3rd Infantry Division and the 7th Army Training Command in Germany disclosed that previous versions and prototypes of ATCCS systems were not being properly utilized due to ineffective training software, a shortage of training materiels, and insufficient training time. As a result, systems were not fully utilized. For example, only a few personnel were familiar with the capabilities of an existing version of MCS. As a result, units were either not using the system or just using the system for message traffic instead of the maneuver control function for which it was designed. Such issues should have been addressed during the materiel acquisition and deployment process.

**Operation Desert Storm.** The Army Report, "Operation Desert Storm Lessons Learned (U)," November 13, 1991, disclosed that Army headquarters elements at every level lacked sufficient manpower positions for command posts that support command and control systems. Thus, personnel staffing of command posts had to be increased by 10 to 100 percent by borrowing personnel from units that were subordinate to the headquarters elements. A senior officer of the 3rd Infantry Division in Europe stated that the units deployed from his division did not use MCS because not enough personnel were trained on its use.

## **Recommendations for Corrective Actions, Management Comments, and Audit Response**

**1.** We recommend that the Army Acquisition Executive direct the Program Executive Officer for Command and Control to revise the System Manpower and Personnel Integration Management Plans for Army Tactical Command and Control Systems as a condition of Milestone III approval. At a minimum, the System Manpower Personnel and Integration Plans should provide for:

- a. Unconstrained analyses to determine whether the Army has adequate manpower authorizations to support operating and training concepts for Component Systems and evaluate the impact of personnel constraints on Systems' life-cycle costs and operational effectiveness.
- b. Evaluation of software and manuals to determine whether they meet minimum reading grade levels for intended operators of the Maneuver Control System and Combat System Support Control System.
- c. Planning of tests and evaluations to determine whether the target audience can operate the Forward Area Air Defense Command Control and Intelligence System, Maneuver Control System, and the Combat Systems Support Control System according to prescribed standards.
- d. Documentation of the results of the above analyses and tests and evaluations.

**2.** We recommend that the Secretary of the Army designate Assistant Secretary of the Army (Manpower and Reserve Affairs) as the proponent for Manpower and Personnel Integration.

**3.** We recommend that the Assistant Secretary of the Army (Manpower and Reserve Affairs):

- a. Review evaluations of System Manpower and Personnel Integration Management Plans made by the Deputy Chief of Staff for Personnel to assure that critical Human Systems Integration issues for major systems receive early and prompt attention and are considered in milestone reviews.
- b. Provide adequate resources to ensure the adequacy of Manpower and Personnel Integration in the materiel acquisition process.

**Management Comments.** As of September 14, 1993, the Army had not provided comments on the draft report. The comments had been requested by August 23, 1993.

**Audit Response.** We request that the Army provide comments to the final report.

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## **Part III - Additional Information**

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## **Appendix A. Description of Audited Component ATCCS Systems**

### **Forward Area Air Defense Command Control and Intelligence System (FAADC<sup>2</sup>I)**

**Project Manager:** Air Defense Command and Control Systems  
Redstone Arsenal, AL

**TRADOC System Manager:** U.S. Army Air Defense Artillery School  
Fort Bliss, TX

**Program Value:** \$756.2 million

**Number of Computers:** 2,053

**Key Events:**

- January 1986: The Army Systems Acquisition Review Council (the Council) directed that the Short Range Command and Control Program be redesignated as the FAADC<sup>2</sup>I, acquisition category ID program.
- July 1986: Deputy Under Secretary of Defense for Acquisition (DUSD-A) approved full-scale development (Acquisition Milestone II).
- March 1989: DUSD-A approved restructuring of the program to allow an initial capability to perform limited air defense as part of full-scale development.
- June 1990: DUSD-A approved restructure to accommodate fielding to Light and Special Divisions beginning in FY 1993.
- January 1993: DUSD-A delegated decision authority for a low-rate initial production decision to the Army Acquisition Executive.
- February 1993: Number of Units to receive FAADC<sup>2</sup>I reduced from 35 to 19.
- September 1993: Planned first unit equipped.
- June 1997: Milestone III review for heavy division by the Council.

**Application Software Functions:**

- The FAADC<sup>2</sup>I will collect, store, process, display, and disseminate air surveillance and air battle information necessary for Air Defense Weapon System Operators to defend ground assets.
- Provide interface with other battlefield functional areas and other air defense elements to prevent attack on friendly aircraft.

## **Appendix A. Description of Audited Component ATCCS Systems**

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### **Planned Deployment:**

- Tactical operations centers and command posts from corps to platoon level.
- Fire units and sensor sections.

### **Operator Military Occupational Specialties:**

- Early Warning System Operator (Military Occupational Specialty 14J)
- Man-Portable Air Defense System or Avenger Operator (Military Occupational Specialty 14S)
- Bradley Stinger Fighting Vehicle Operator (Military Occupational Specialty 14R)

### **System Replaced:**

- Manual procedures (Binoculars, Greasepads, and FM Radios)

## **Maneuver Control System (MCS)**

**Program Manager:** Operational Tactical Data Systems  
Fort Monmouth, NJ

**TRADOC System Manager:** U.S. Army Combined Arms Command  
Fort Leavenworth, KS

**Program Value:** \$3.4 billion

### **Number of Computers:**

- 7,679 New nondevelopmental items
- 98 Existing nondevelopmental items
- 206 Military Specification Computers  
7,983

## **Appendix A. Description of Audited Component ATCCS Systems**

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### **Key Events:**

- July 1991: Program upgraded to acquisition category IC.
- July 1992: Program redesignated as Defense Acquisition Board Program (Acquisition Category ID).
- 4th Quarter 1996: Milestone III review by the Council.

### **Application Software Functions:**

- Enable operations staffs to quickly process and distribute battle plans and orders to units.
- Provide commanders and operations staffs with real time visibility of operations.

### **Planned Deployment:**

- Corps to platoon levels.
- Located at command posts for Armor, Signal, Infantry, Engineer, Aviation, Military Police, and Chemical Operator Military Occupational Specialties.

### **Operator Military Occupational Specialties:**

- No dedicated specialties

### **Systems Replaced:**

- Manual procedures
- Approximately 1,494 existing nondevelopmental items (computers) in the active Army will be provided to reserve units.

## **Appendix A. Description of Audited Component ATCCS Systems**

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### **Advanced Field Artillery Tactical Data System (AFATDS)**

**Project Manager:** Field Artillery Tactical Data Systems  
Fort Monmouth, NJ

**TRADOC System Manager:** U.S. Army Field Artillery School  
Fort Sill, OK

**Program Value:** \$877 Million

**Number of Computers:** 4,445

#### **Key Events:**

- March 1984: Vice Chief of Staff of the Army approved Concept Evaluation without the Council review (Milestone I).
- September 1989: As an acquisition program IC, the Council approved full-scale development (Milestone II).
- June 1994: Planned production decision by Army Acquisition Executive (Milestone III).
- September 1995: Initial operational capability Application Software Functions.

#### **Application Software Functions:**

- Provide a modernized automated decision support system for use by Fire Support and Field Artillery Units in Target acquisition; Managing weapons and ammunition; Command and Control; Coordination of systems, facilities, and personnel.
- Provide communication between Fire Support Control Units and other functional segments, Services, and nations.

#### **Planned Deployment:**

- Fire Support Units from platoon level to echelons above corps.

#### **Operator Military Occupational Specialties:**

- Cannon Fire Direction Specialist (13E)
- Fire Support Specialist (13F)
- Tactical Fire Direction System Operations Specialist (13C) to be reclassified as an AFATDS Operator (13D).
- Multiple Launch Rocket System/Lance Operations/Fire Direction Specialist (13P) to be reclassified as a AFATDS Operator (13D).

## **Appendix A. Description of Audited Component ATCCS Systems**

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### **Systems Replaced:**

- Tactical Fire Direction System
- Lightweight Tactical Fire Direction System
- Battery Computer System
- Interim Fire Support Automated System
- Fire Detection Data Manager Fire Direction system

### **Combat Service Support Control System (CSSCS)**

**Project Manager:** Combat Service Support Control System  
Fort Belvoir, VA

**TRADOC System Manager:** Combined Arms Support Command  
Fort Lee, VA

**Program Value:** \$291 million

**Number of Computers:** 1,115

### **Key Events:**

- January 1989: Assistant Secretary of the Army (Research, Development and Acquisition) decided CSSCS would be managed as an acquisition category IC program.
- December 1990: Engineering and Manufacturing development of CSSCS approved by Army Acquisition Executive (Acquisition Milestone II).
- February 1994: Planned Production Decision by the Army Acquisition Executive (Acquisition Milestone III).

### **Application Software Functions:**

- Provide rapid collection, analysis, and dissemination of critical Combat Service Support information to support the force-level commanders' tactical decisions.
- Provide Combat Service Support Commanders with enhanced Command and Control capabilities.

## **Appendix A. Description of Audited Component ATCCS Systems**

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### **Planned Deployment:**

- All Combat Service Support Units and Headquarters Staffs within Maneuver Brigades, Separate Brigades, Armored Cavalry Regiments, Divisions, Corps, and Echelons above Corps.

### **Operator Military Occupational Specialties:**

- No dedicated specialty

### **System Replaced:**

- Manual procedure

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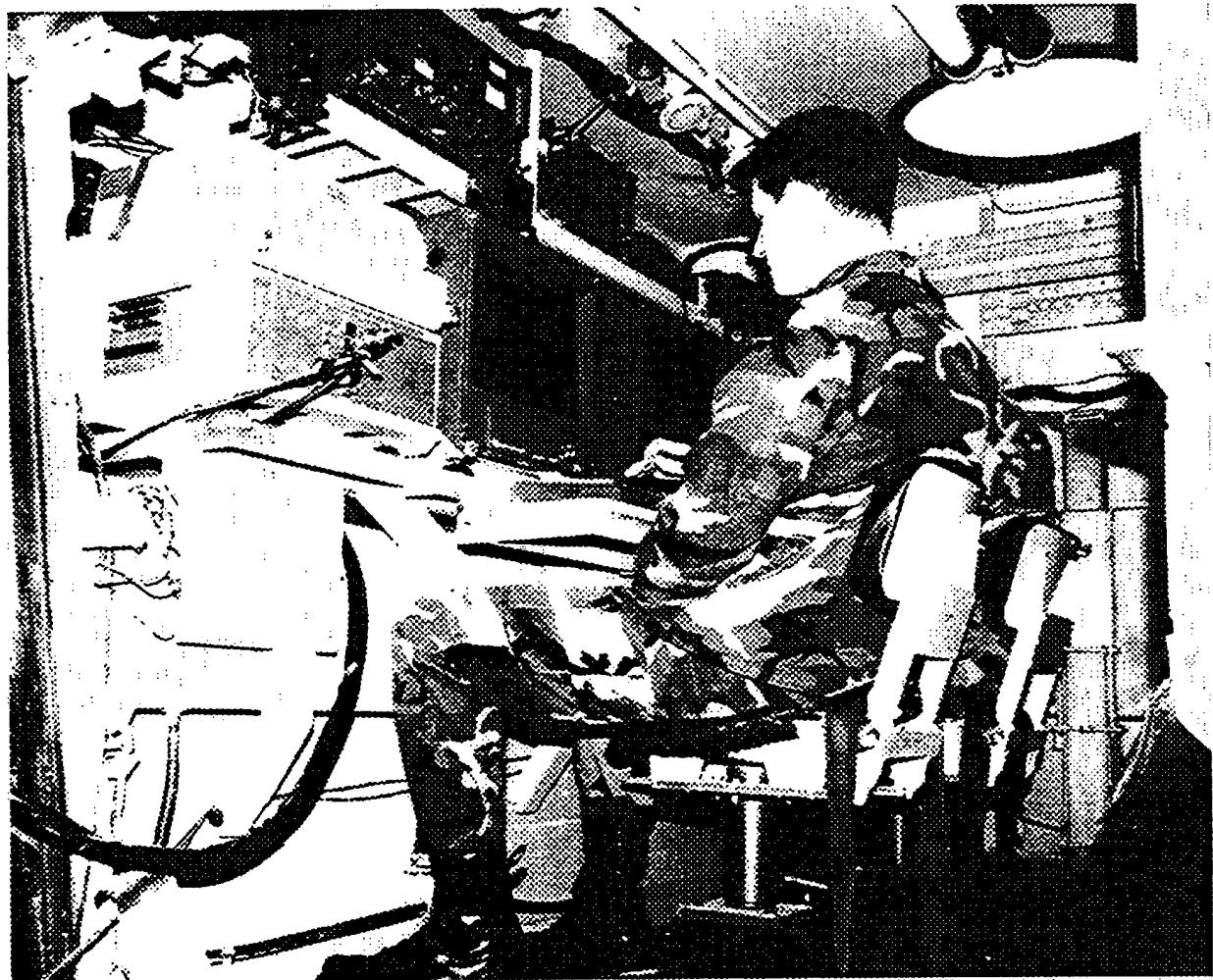
## **Appendix B. Photos of Common Hardware Equipment**



Soldier using a Simplified Handheld Terminal Unit

## **Appendix B. Photos of Common Hardware Equipment**

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**Soldiers using equipment in one of the shelters that will house Army Tactical Command and Control Nodes**

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## **Appendix C. Summary of Potential Benefits Resulting From Audit**

<b>Recommendation Reference</b>	<b>Description of Benefit</b>	<b>Amount and/or Type of Benefit</b>
1.a.	Economy and Efficiency. Determine manpower, personnel, and training requirements and available resources for requirements in support of ATCCS.	Nonmonetary.
1.b.	Economy and Efficiency. Would ensure that operating and training materials meet the needs of intended operators.	Nonmonetary.
1.c.	Economy and Efficiency. Would ensure that intended operators can effectively use operating and training materials.	Nonmonetary.
1.d.	Economy and Efficiency. Adequately inform Army System Acquisition Review Council about the impact of manpower, personnel, and training issues for Milestone III decisions.	Nonmonetary.
2.	Economy and Efficiency. Improve emphasis for Manpower and Personnel Integration.	Nonmonetary.
3.a.	Internal Control. Improve oversight of Manpower and Personnel Integration.	Nonmonetary.
3.b.	Economy and Efficiency. Provide appropriate resources for Manpower and Personnel Integration.	Nonmonetary.

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## **Appendix D. Organizations Visited or Contacted**

### **Office of the Secretary of Defense**

Assistant Secretary of Defense (Command, Control, Communications and Intelligence),  
Washington, DC  
Assistant Secretary of Defense (Force Management and Personnel), Washington, DC  
Defense Manpower Data Center, Arlington, VA  
Defense Manpower Data Center, Monterey, CA  
Assistant Secretary of Defense (Economic Security), Washington, DC  
Assistant Secretary of Defense (Program Analysis and Evaluation), Washington, DC  
Director for Operational Test and Evaluation, Washington, DC  
Director for Acquisition Program Integration, Under Secretary of Defense  
(Acquisition), Washington, DC

### **Unified and Specified Commands**

Commander in Chief, U.S. European Command, Vaihingen, GE

### **Department of the Army**

Assistant Secretary of the Army (Manpower and Reserve Affairs), Washington, DC  
Assistant Secretary of the Army (Research, Development, and Acquisition),  
Washington, DC  
Army Chief of Staff for Operations and Plans, Washington, DC  
Army Chief of Staff for Personnel, Washington, DC  
Headquarters, U.S. Army Europe, Heidelberg, GE  
Headquarters, 7th Army Training Command, Grafenwoehr, GE  
Headquarters, Army Forces Command, Fort McPherson, GA  
Headquarters, Army Materiel Command, Alexandria, VA  
Headquarters, Army Operational Test and Evaluation Command, Alexandria, VA  
Headquarters, Army Personnel Command, Alexandria, VA  
Headquarters, Army Training and Doctrine Command, Fort Monroe, VA  
U.S. Army Combined Arms Command, Fort Leavenworth, KS  
U.S. Army Combined Arms Support Command, Fort Lee, VA  
U.S. Army Training and Doctrine Command, Analysis Command, White Sands  
Missile Range, NM  
U.S. Army Air Defense Artillery School, Fort Bliss, TX  
U.S. Army Field Artillery School, Fort Sill, OK  
U.S. Army Signal School, Fort Gordon, GA  
Headquarters, XVII Airborne Corps, Fort Bragg, NC  
5th Battalion of the 8th Field Artillery  
Headquarters, U.S. Army V Corps, Frankfurt, GE  
Headquarters, 3rd Infantry Division, Wurzburg, GE  
Division Artillery, Wurzburg, GE  
703rd Main Support Battalion, Kitzingen, GE  
3rd Forward Support Battalion, Schweinfurt, GE

## **Appendix D. Organizations Visited or Contacted**

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123rd Signal Brigade, Kitzingen, GE  
4th Battalion of the 3rd Air Defense Artillery, Kitzingen, GE  
3rd Battalion of the 1st Field Artillery, Bamberg, GE  
5th Battalion of the 41st Field Artillery, Schweinfurt, GE  
6th Battalion of the 1st Field Artillery, Vilcek, GE  
Headquarters, 82nd Airborne Division, Fort Bragg, NC  
3rd Battalion of the 4th Air Defense Artillery  
1st Battalion of the 319th Airborne Field Artillery  
82nd Signal Battalion  
Headquarters, 35th Signal Brigade, Fort Bragg, NC  
50th Signal Battalion  
426th Signal Battalion  
Program Executive Office, Command and Control Systems, Fort Monmouth, NJ  
Project Manager, Air Defense Command and Control Systems, Huntsville, AL  
Project Manager, Combat Service Support Control System, Fort Belvoir, VA  
Project Manager, Common Hardware and Software, Fort Monmouth, NJ  
Project Manager, Field Artillery Tactical Data Systems, Fort Monmouth, NJ  
Program Manager, Operations Tactical Data Systems, Fort Monmouth, NJ  
Project Manager, Mobile Subscriber Equipment, Program Executive Office,  
Communications Systems, Fort Monmouth, NJ  
Project Manager, Single Channel Ground and Airborne Radio Systems, Program  
Executive Office, Communications Systems, Fort Monmouth, NJ

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## **Appendix E. Report Distribution**

### **Office of the Secretary of Defense**

Under Secretary of Defense (Acquisition)  
Assistant Secretary of Defense (Economic Security)  
Assistant Secretary of Defense (Force Management and Personnel)

### **Department of the Army**

Secretary of the Army  
Assistant Secretary of the Army (Manpower and Reserve Affairs)  
Assistant Secretary of the Army (Research, Development and Acquisition)  
Inspector General, Department of the Army

### **Non-DoD Activities**

Office of Management and Budget  
U.S. General Accounting Office, National Security International Affairs Division,  
Technical Information Center

Chairman and Ranking Minority Member of the Following Congressional Committees  
and Subcommittees:

Senate Committee on Appropriations  
Senate Subcommittee on Defense, Committee on Appropriations  
Senate Committee on Armed Services  
Senate Subcommittee on Manpower and Personnel, Committee on Armed  
Services  
Senate Committee on Governmental Affairs  
House Committee on Appropriations  
House Subcommittee on Defense, Committee on Appropriations  
House Committee on Armed Services  
House Subcommittee on Military Acquisitions, Committee on Armed Services  
House Subcommittee on Military Forces and Personnel, Committee on Armed  
Services  
House Committee on Government Affairs  
House Subcommittee on Legislation and National Security, Committee on  
Government Operations

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